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ABSTRACT

The effectiveness of two performance-based teacher education programs at Washington State University were compared. The programs were identical in content, performance objectives, and textbooks. In one program, however, the content was presented through independent study modules; the other program presented the content through regular classroom interaction. One hundred and thirty elementary education majors with comparable grade point averages were randomly assigned to five sections of an education methods course. Two sections used the independent study module and the remaining sections used group instruction. A student attitude inventory showed no significant differences among instructors who were scheduled for both treatment groups. Statistical analysis of both treatment groups showed a) a higher cognitive achievement level for group-instructed students, b) no significant difference in teaching performance for either group, c) no significant difference in attitudes of students toward instructors, and d) no significant difference in attitudes of students toward the course. It was concluded that independent study, when geared to specific performance objectives, can be as effective or more effective than group instruction in teacher education. (Four tables of statistical data are included.) (BRB)

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A COMPARISON BETWEEN TWO PERFORMANCE-BASED TEACHER EDUCATION PROGRAMS: INDEPENDENT-STUDY MODULES vs. REGULAR GROUP INSTRUCTION

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Although numerous studies have been made on the effectiveness of performance-based teacher education (American Association of Colleges for Teacher Education, 1971) and several researchers have investigated independent-study programs at the college level (Bonthius, Davis, & Drushal, 1957; Churchill, 1960; Distasio, 1966; Dixon, 1965; Felder, 1964; Melnick, 1969), to the writers' knowledge no studies previously have been made of programs which combine the two ideas in a teacher education program.

The purpose of the study described in this report was to compare the effectiveness of two teacher education sub-programs at Washington State University. The sub-programs were identical in content, performance objectives, and textbooks. However, in one sub-program the content was presented through independent-study modules, while in the other sub-program the content was presented through regular interaction in classroom groups of 25 to 30 students.

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The independant-study modules were described by May ( ) in an earlier issue of The Journal of Teacher Education. In brief, each of the eleven modules used in the study consisted of a statement of rationale, a list of performance objectives at the knowledge level, a list of performance objectives at the simulation level, and a list of performance objectives at the classroom application level. The objectives were followed by suggested readings, audio-tapes, and video-tapes.

The sub-programs were incorporated into Education 304, a six semester hour course dealing with methods of teaching reading, other language arts, and children's literature. This course requires a moderate amount of teaching and observing in the nearby public schools. Thus, it was possible to establish performance objectives at the three levels previously mentioned: knowledge, simulation, and classroom application.

The population consisted of 130 students who were juniors majoring in elementary education. These students were randomly assigned to five sections. Two of the sections were provided with the independent-study modules and were instructed to work largely on their own, with occasional tutorial assistance from the instructor and with weekly "knowledge checks" via brief multiple-choice tests. The other three sections were instructed through regular class meetings. They, too, were provided with tutorial assistance when it was desired; knowledge checks were used occasionally but were not an integral part of the program.

Even though the two treatment groups were assumed to be randomly selected by regular computer scheduling, two types of checks were made on the similarity of the two treatment groups. One check was a comparison of the G.P.A. of the two groups over the previous five semesters of university work. This check demonstrated that there was no significant difference in the mean G.P.A. between the two treatment groups. Another check was a comparison of the two sets of instructors--the three instructors who worked with regular groups and the two instructors who worked with independent-study groups. To make this comparison two attitude inventories were administered to each instructor's Education 304 section at the end of the <u>previous</u> semester. These students, of course, were <u>not</u> the same students as the population for the study. One of the inventories measured the students' attitude toward the instructor; the other inventory measured

the students' attitude toward the course (Education 304). In both cases there were no significant differences between instructors who were scheduled to take independent-study groups the following semester and those who were scheduled to take regular groups. Thus, some degree of control for instructor personality and effectiveness was obtained.

Several hypotheses were tested.* Among them were the following:

Hypothesis One: There is no significant difference in cognitive achievement between teacher trainees who have completed Education 304 through independent-study modules and those who have completed it through regular group instruction.

This hypothesis was tested by means of an eighty-item, multiple-choice examination developed by Pope (1971, pp. 103-121) and administered to all students in both treatment groups at the end of the experimental semester. Content validity for the examination had been established by submitting a much larger selection of items to all five instructors and selecting only those which all five instructors felt were relevant to what had been emphasized during the semester. A Kuder-Richardson reliability coefficient of .71 was computed on the basis of the responses from all five sections.

Table I shows the results related to hypothesis one. As seen in the table, the combined independent-study sections, called the "experimental" group, achieved a mean score that was considerably higher than the mean score achieved by the combined regular sections, called the "control" group. This difference in means was significant at the one percent level of confidence. Thus, hypothesis one was rejected.

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Insert Table I about here
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*Full coverage of the hypotheses is given in Pope's unpublished dissertation, Washington State University, 1971.

TABLE I

SUMMARY STATISTICS AND ANALYSIS OF VARIANCE

OF EXPERIMENTAL AND CONTROL GROUP MEAN SCORES ON ACHIEVEMENT TEST (80 ITEMS)

Treatment Groups	N	Mean	S.D.
Experimental	54	65.11	4.92
Control	76	61.97	6.32
Total	130	63.28	5.98

Source of Variation	df	SS	MS	F
Between	1	310.69	310.69	
Within	128	4343.38	33.93	
Total	129	4654.06		9.16

Required F for various levels of significance:

F = 2.75	F = 3.92	F = 6.85
P = .10	P = .05	P = .01

The rejection of hypothesis one does not prove that independent-study is more effective than regular group instruction. It does demonstrate, however, that the independent-study sections were able to acquire and retain more knowledge related to the course content. One reason for their success is probably the high degree of specificity provided by the module program. That is, not only were the knowledge-level performance objectives for independent-study sections tied directly into the weekly "knowledge checks" (something that was not always done in the more open-ended group sections), but also the readings and other information were specifically geared to the knowledge-level performance objectives. Furthermore, since a minimum level of acceptance (80%) was required on each knowledge check, the students in the independent-study sections were "forced" to know the material before they could go on to simulation and classroom application activities.

On the other hand, the significant difference observed, in favor of the experimental group, certainly may be interpreted as evidence of the success of independent-study modules in this particular type of program. Simply stated, it is likely that the modules were more specific in their expectations of knowledge-level performance than the instructors who taught the regular group sections and that this greater degree of specificity led to a higher level of achievement.

Hypothesis Two: There is no significant difference in teaching performance between teacher trainees who have completed Education 304 through independent-study modules and those who have completed it through regular group instruction.

This hypothesis was tested by means of ratings that were assigned to students by cooperating teachers in the nearby public schools after the students had participated in a program of observation and teaching three hours a week for ten weeks. As mentioned earlier, this program was tied directly to Education 304.

Each student was rated on a zero-to-four scale for six items: attendance, teaching performance, written plans, additional work with children, helpfulness on tasks not directly involving children, and on professional attitude and behavior. The maximum score a student could receive was 24 points.

As shown in Table 2 the students in both the experimental group and control group were rated equally high, although there was somewhat more variability among the control students. Thus, hypothesis two must be accepted. The independent-study modules evidently had no greater influence on teaching performance than the regular group instruction.

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Insert Table 2 about here
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The lack of a significant difference on teaching performance is not surprising since no major differentiation in treatment was applied with respect to performance objectives at the classroom application level. The control and experimental students were asked to do essentially the same things in the classroom and were evaluated in the same way--and only by the classroom teachers and not the course instructors. Any difference that showed up would have had to have been related to the more specific mastery of knowledge level objectives accomplished by the experimental students. No such difference was ascertained by the simple rating device used. It is possible that a rating scale that was more precise in the specific points upon which the students were being evaluated would have differentiated between the two treatment groups. On the other hand, lacking a more precise objective rating scale for teaching performance, the course instructors possibly could have determined more precisely than the supervising teachers the specific aspects of teaching performance which corresponded to the instruction in the course, thereby giving a more accurate measure of performance as related to course content.

TABLE 2

SUMMARY STATISTICS AND ANALYSIS OF VARIANCE

OF EXPERIMENTAL AND CONTROL GROUP MEAN RATINGS OF TEACHING PERFORMANCE

Treatment Groups	N	Mean	S.D.
Experimental	54	21.48	2.48
Control	76	20.96	3.07
Total	130	21.18	2.85

Source of Variation	df	SS	MS	F
Between	1	8.57	8.57	
Within	128	1048.37	8.19	
Total	129	1056.93		1.05

Required F for various levels of significance:

F = 2.75	F = 3.92	F = 6.85
P = .10	P = .05	P = .01

Hypothesis Three: There is no significant difference in the attitude toward the "instructor" between teacher trainees who have completed Education 304 through independent-study modules and those who have completed it through regular group instruction.

This hypothesis was tested by means of a 30-item attitude inventory developed by May (1970) called Attitude Toward Professor X. This inventory was developed by using Edward's (1967) scale-discrimination technique. A Spearman-Brown reliability coefficient of .94 was computed on the basis of the responses from all five sections.

As seen in Table 3 there was no significant difference between the control and experimental groups. Thus, hypothesis three must be accepted.

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Insert Table 3 about here
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The lack of any significant difference seems to be of psychological importance. It might have been predicted that a difference would occur in favor of the control instructors, since these instructors had more contact with their students, were actually "instructing" in the traditional sense of the word, and theoretically were more capable of providing their students with personal encouragement, with a figure of identification, and with other "personal touches." The lack of difference in mean response may indicate that the opportunity to meet their "instructor" occasionally as a tutor and advisor is sufficient to match the degree to which certain personal needs are handled in a regular group situation.

It might also have been predicted that the experimental group would not have been done as well since they would perceive their "instructor" as merely an administrator of weekly knowledge tests, a glorified record keeper, and an overpaid tutor. Again, the evidence indicates that perhaps such contacts--particularly the tutoring one--were perceived by many as personal and meaningful. Subjective comments from the two instructors who were in charge of the independent-study sections would support such an interpretation.

TABLE 3

SUMMARY STATISTICS AND ANALYSIS OF VARIANCE

OF ATTITUDE TOWARD PROFESSOR X

Treatment Groups	N	Mean	S.D.
Experimental	53	141.38	24.63
Control	76	143.41	22.44
Total	129	142.57	23.39

Source of Variation	df	SS	MS	F
Between	1	129.00	129.00	
Within	127	70424.00	554.52	
Total	128	70553.00		0.23

Required F for various levels of significance:

F = 2.75 P = .10

F = 3.92 P = .05

F = 6.85 P = .01

Hypothesis Four: There is no significant difference in attitude toward the course between teacher trainees who have completed Education 304 through independent-study modules and those who have completed it through regular group instruction.

This hypothesis was tested by means of a 24-item attitude inventory developed by Merrick (1970) called Attitude Toward Education 304. This inventory was developed by using Edward's (1967) scale-discrimination technique. A Spearman-Brown reliability coefficient of .93 was computed on the basis of the response from all five sections.

As seen in Table 4 there was a significant difference between the experimental and control groups, in favor of the control group. However, this difference was significant only at the ten percent level of confidence. Hypothesis Four may be either rejected or accepted according to the reader's criterion of significance.

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Insert Table 4 about here

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The possible difference in favor of the control group may have reflected the more arduous responsibilities of independent-study imposed on a randomly-selected rather than voluntary group of students. Several students in the two independent-study sections commented that they had "to work harder than the 'kids' in the other groups."

This perceived difference in degree of arduousness may be an important factor to consider in implementing a performance-based, independent-study program. The independent-study students felt that they were spending a great deal of time in the library--"much more than we usually have to." Part of this feeling probably comes from not realizing that the time they would normally spend in class was spent in the library instead. Part of this feeling comes from working with modules which

TABLE 4

SUMMARY STATISTICS AND ANALYSIS OF VARIANCE

OF ATTITUDE TOWARD EDUCATION 304

Treatment Groups	N	Mean	S.D.
Experimental	53	97.62	21.65
Control	76	104.24	19.16
Total	129	101.52	20.48

Source of Variation	df	SS	MS	F
Between	1	1366.00	1366.00	
Within	127	52731.00	415.20	
Total	128	54097.00		3.29

Required F for various levels of significance:

F = 2.75	F = 3.92	F = 6.85
P = .10	P = .05	P = .01

are not quite specific enough in directing them to pertinent sources; thus they spend a certain amount of time searching for appropriate sources or pages in those sources. (The advantages of providing more specific references, however, are somewhat negated by the loss of opportunity to learn appropriate searching behavior.) And part of this feeling comes from the reality of the weekly knowledge checks which force the students to "really know the stuff."

In conclusion, it appears that independent-study, when geared to specific performance objectives, can be as effective--and probably even more effective--than group instruction in teacher education. This conclusion may only be applicable to methods-type courses and perhaps to only certain ones of these. The independent-study modules developed for children's literature, for example, seemed to be more difficult to prepare and use than those related to less affective topics such as the teaching of word recognition skills. It might be even more difficult to develop adequate modules for art education. Nevertheless, this study demonstrates that independent-study in conjunction with performance objectives may be a highly useful technique in teacher education. Furthermore, since the particular strength of the independent-study modules--the highly specific objectives at the knowledge level--led to superior performance on the achievement test by the independent-study group, it would appear advisable to develop modules in which objectives related to classroom performance are also highly specific--objectives which indicate conditions, behavior, and criteria and require rather specific evaluation by course instructors or supervisory teachers.

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